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SERIAL NO.:

TITLE: FLUORESCENT TANNING LAMP WITH IMPROVED SERVICE LIFE

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FIELD OF THE INVENTION

The present invention relates generally to fluorescent lamps used in tanning beds, and particularly to an electrode shield for use therewith.

BACKGROUND OF THE INVENTION

Fluorescent lamps generally have a limited service life. The service life is proportional to the life of the electrode and emission material. The emission material may be expended due to ion bombardment, vaporization of emission material, and chemical reactions between the emission material and gaseous impurities in the lamp. The starting process additionally produces higher voltages, which reduce the life of the lamp. This is particularly troublesome in tanning lamps, which use relatively high

current and are cycled on and off repeatedly. Tanning lamps generally have currents ranging between 800 milliamperes and 2000 milliamperes. This current is higher than the typical fluorescent lamp current, which may range between 400 milliamperes and 800 milliamperes. Heat generated from the higher currents in a tanning lamp also result in shorter lamp life. Therefore, there is a need for an improved fluorescent tanning lamp structure that improves performance and increases the useful life of a fluorescent tanning lamp.

SUMMARY OF THE INVENTION

The present invention is directed to a florescent tanning lamp with an improved service life. A tanning lamp has an electrode at either end of a glass tube. A cup having an open end contains or surrounds each of the electrodes and acts as an electrode shield. In one embodiment, the cup is mounted on an insulated stem of the fluorescent tanning lamp and is electrically insulated from the electrode. In another embodiment, the cup is supported by a cup support attached to an electrode support or a lead wire attached to the electrode and is electrically and

thermally coupled thereto and aids in shielding and dissipating heat from the cup.

Accordingly, it is an object of the present invention to provide an improved fluorescent tanning lamp that has an increased service life.

It is another object of the present invention to provide a fluorescent tanning lamp that can accommodate repeated on and off cycles while minimizing any reduction in service life.

It is an advantage of the present invention that reduced sputtering impurities are entered into the arc stream resulting in cleaner phosphor surfaces and providing a longer effective UV output.

It is a further advantage of the present invention that a more uniform electrode temperature is obtained resulting in less severe evaporation of emission material, thereby reducing contamination of the phosphor.

It is a further advantage of the present invention that a cooler cold spot temperature is obtained behind the electrode providing a more stable mercury vapor pressure.

It is a feature of the present invention that a cup surrounding the electrode is electronically coupled to a lead wire of the fluorescent tanning lamp.

These and other objects, advantages, and features will become readily apparent in view of the following more detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view schematically illustrating a tanning fluorescent lamp in a tanning bed.

Fig. 2 is a perspective view illustrating one end of a fluorescent tanning lamp.

Fig. 3 is a partial cross section of one end of another embodiment of a fluorescent tanning lamp.

Fig. 4 is a perspective view of one end of a fluorescent tanning lamp.

Fig. 5 is an elevational view of an electrode structure of one end of a fluorescent tanning lamp.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 schematically illustrates a tanning bed 10 having a plurality of tubular fluorescent tanning lamps 12 therein. Each of the fluorescent tanning lamps 12 has an electrode placed in each end. Fluorescent tanning lamps 12

are often cycled on and off repeatedly throughout the day. This cycling on and off often reduces the service life of prior fluorescent tanning lamps.

Fig. 2 illustrates one end of the fluorescent tanning lamps 12, illustrated in Fig. 1. The fluorescent tanning lamp 12 comprises a glass tube 14. On one end of the glass tube 14 is a seal 15. A first electrical contact pin 16 and a second electrical contain pin 18 are placed on the end of the fluorescent tanning lamp. The contact pins 16 and 18 are adapted to fit within a socket of a fluorescent tanning lamp fixture within the tanning bed 10, illustrated in Fig. 1. Lead wires 20 and 22 electrically couple the contact pins 18 and 16 to a filament or electrode 32. The lead wires 20 and 22 extend through an insulating stem 24. The lead wires 20 and 22 extend through a slot 26 formed in the base of a cup 34 and form electrode supports 28 and 30 attached to electrode 32. Cup 34 surrounds or encircles the electrode 32 on all sides, but for a top opening. The top opening is preferable free from any material so as to assist in dissipating heat and is open for the entire diameter of the cylindrical cup 34. The cup 34 acts as an electrode shield to shield electrode 32. The electrode 32 is held in position by electrode supports 28 and 30

extending through slot 26 and into the interior of cup 34. The electrode 32 generally has an emission material thereon. Cup 34 is held in position by shield support 36. One end of the shield support 36 extends into the glass stem 24 and the other end of the shield support 36 is attached to the base of cup 34. In this embodiment, the cup 34 is electrically insulated or isolated or dead.

Fig. 3 illustrates another embodiment of the present invention. In this embodiment, the fluorescent tanning lamp 112 comprises a tube 114 sealed with seal 115. Lead wires 120 and 122 extend through a glass stem 124 and through a slot 126 in the base of cup 134. Supports 128 and 130 hold filament or electrode 132. The electrode 132 may have an emission material thereon. The cup 134 is open on the end opposing the slot 126. A shield support 136 is electrically coupled to the lead wire 122 and the electrode support 128. The shield support 136 is attached to the base of the cup 134. The shield support 136 has a size sufficient to act as a heat sink and is made of an electrically conductive material with desirable heat sink thermal properties. The shield support 136 may be made of the same material as the cup 134, which may be iron, nickel, or any equivalent material or compound. In this embodiment, the cup 134 is

live, because the cup 134 is electrically coupled to the lead wire 122 and electrode support 128. The shield support 136 may be attached to the cup 132, the lead wire 122 or electrode support 128 by any conventional means such as soldering or any equivalent thereto.

Fig. 4 illustrates another view of the embodiment of the present invention illustrated in Fig. 3. The shield support 136 has a relatively large surface area and helps conduct heat away from the electrode 132, preventing high temperatures from developing. The shield support 136 is in the shape of an L-shaped bracket and has a width substantially greater than the diameter of the lead wire 122 or electrode support 128, illustrated in Fig. 3. This width helps to secure the cup 134 and provides additional surface area to dissipate heat.

Fig. 5 is an elevational view illustrating the electrode structure without the glass tube. The L-shaped electrode support 136 is clearly illustrated attached to the cup 134 and electrode support 136.

The present invention provides a cup to act as an electrode shield that greatly improves the service life of fluorescent tanning lamps that are frequently cycled on and off and that are operated at relatively high curents. The

present invention reduces the end darkening of a fluorescent lamp behind the electrode or filament. Additionally, sputter may be contained within the cup. This reduces the impurities that may enter the arc stream resulting in cleaner phosphor surfaces within the glass tube, enhancing the longevity of the effective ultraviolet output of the tanning lamp. Additionally, the cup provides a uniform electrode temperature resulting in less severe evaporation of emission material contained on the electrode, resulting in less phosphor contamination. The cup additionally provides a cooler cold spot temperature behind the electrode or filament resulting in more stable mercury vapor pressure and more efficient use.

While the present invention has been described with respect to several preferred embodiments, it will be obvious to those skilled in the art that variations may be made without departing from the spirit and scope of this invention.